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(54) Abstract Title
Printing from, and creating, print-enabled Web hypermedia advertisement banners

(57) Creating print-enabled JAVA applet advertisement banners (Figs. 3 and 4). Whereas normally, clicking on a banner advertisement would take the user to the home page of the advertising business, and the user would have to navigate the Web to find the appropriate information (click-through), the present invention provides extensions to the advertisement banners, enabling printed content to be obtained with a one-click request from the Web advertisement. This enables direct Web delivery of, e.g. printed produce literature, purchase orders, coupons, gift certificates and tickets, without the advertiser needing to develop a Web site. When the user clicks on the banner to request a printable page, a hard copy server retrieves the requested information and formats it based on the capabilities of the requesting Web browser, platform and operating system. Print enabling code (i.e. to cause automatic page printing or to provide printing instructions for the user, depending on whether or not the browser is print-capable) are also embedded into the printable page before sending it to the browser. The printable content can be dynamically generated, and the printed deliveries can be tracked.

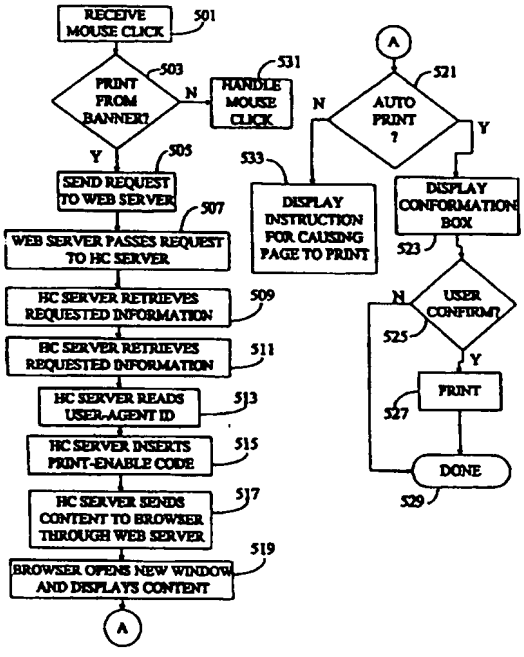


FIG. 5

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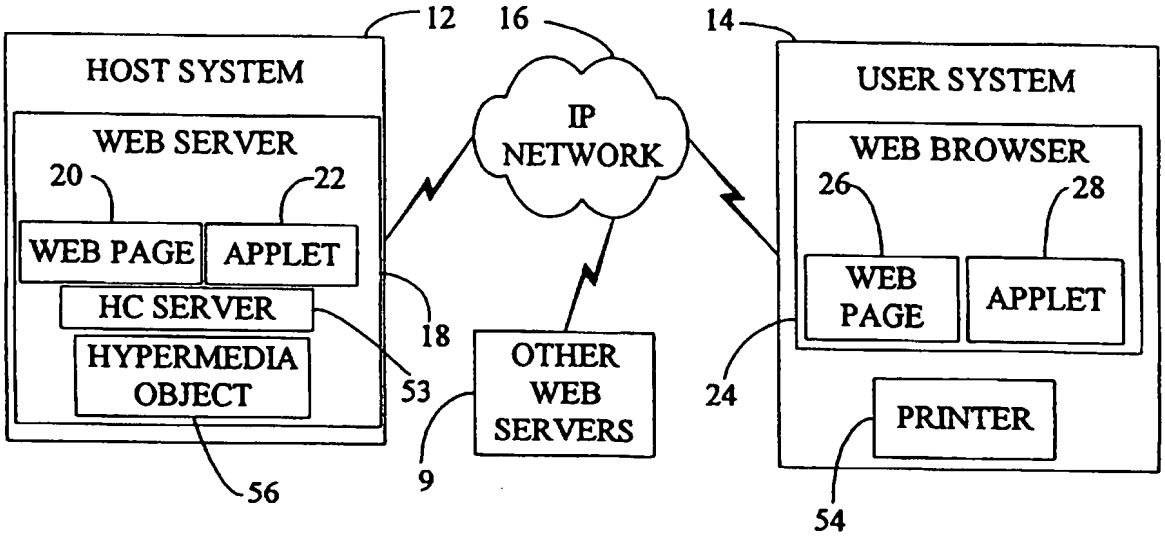

12
16
14
HOST SYSTEM
WEB SERVER
20
22
WEB PAGE
APPLET
HC SERVER
HYPERMEDIA OBJECT
IP NETWORK
USER SYSTEM
WEB BROWSER
26
28
WEB PAGE
APPLET
PRINTER
18
53
56
9
OTHER WEB SERVERS
24
54

FIG. 1

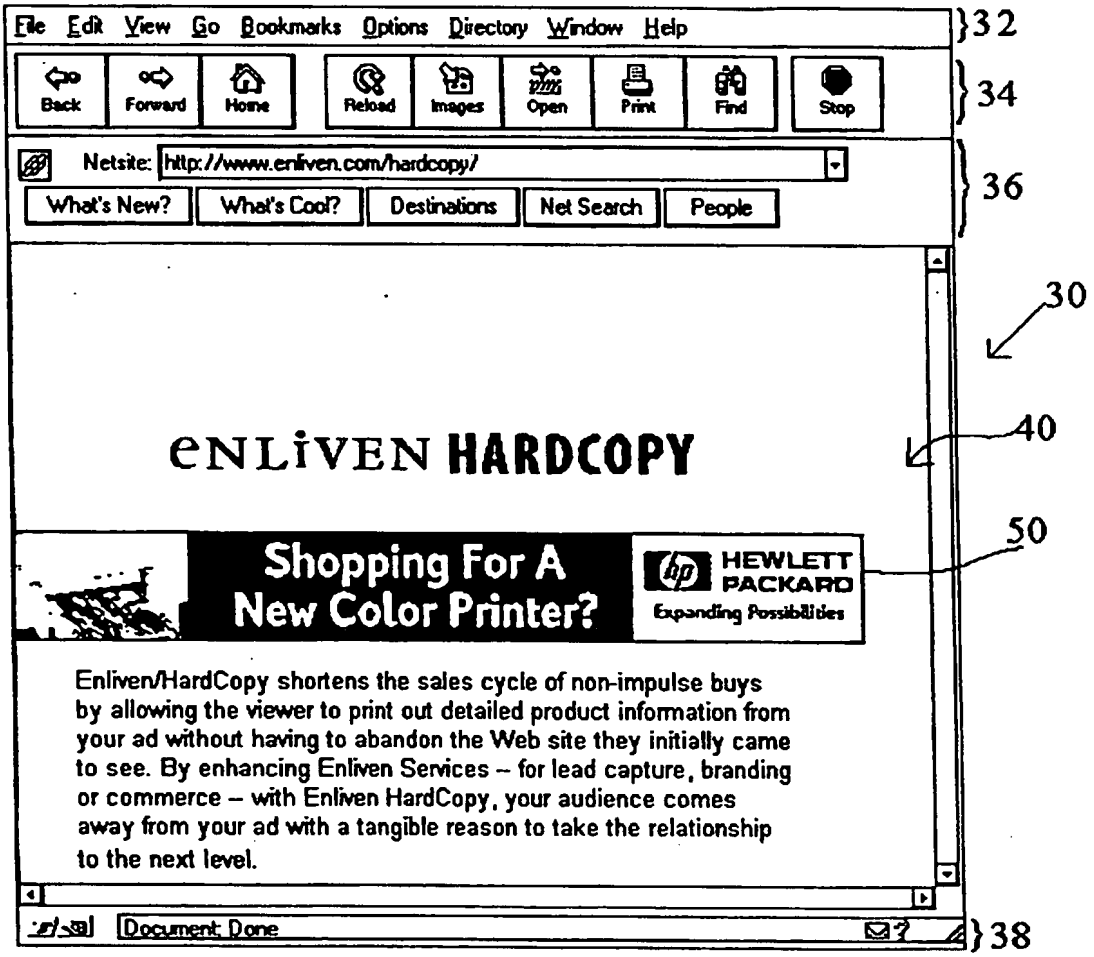

File Edit View Go Bookmarks Options Directory Window Help
32
Back
Forward
Home
Reload
Images
Open
Print
Find
Stop
34
Netsite: http://www.enliven.com/hardcopy/
What's New?
What's Cool?
Destinations
Net Search
People
36
30
ENLIVEN HARDCOPY
40
Shopping For A New Color Printer?
HEWLETT PACKARD
Expanding Possibilities
50
Enliven/HardCopy shortens the sales cycle of non-impulse buys by allowing the viewer to print out detailed product information from your ad without having to abandon the Web site they initially came to see. By enhancing Enliven Services -- for lead capture, branding or commerce -- with Enliven HardCopy, your audience comes away from your ad with a tangible reason to take the relationship to the next level.
Document: Done
38

FIG. 2A

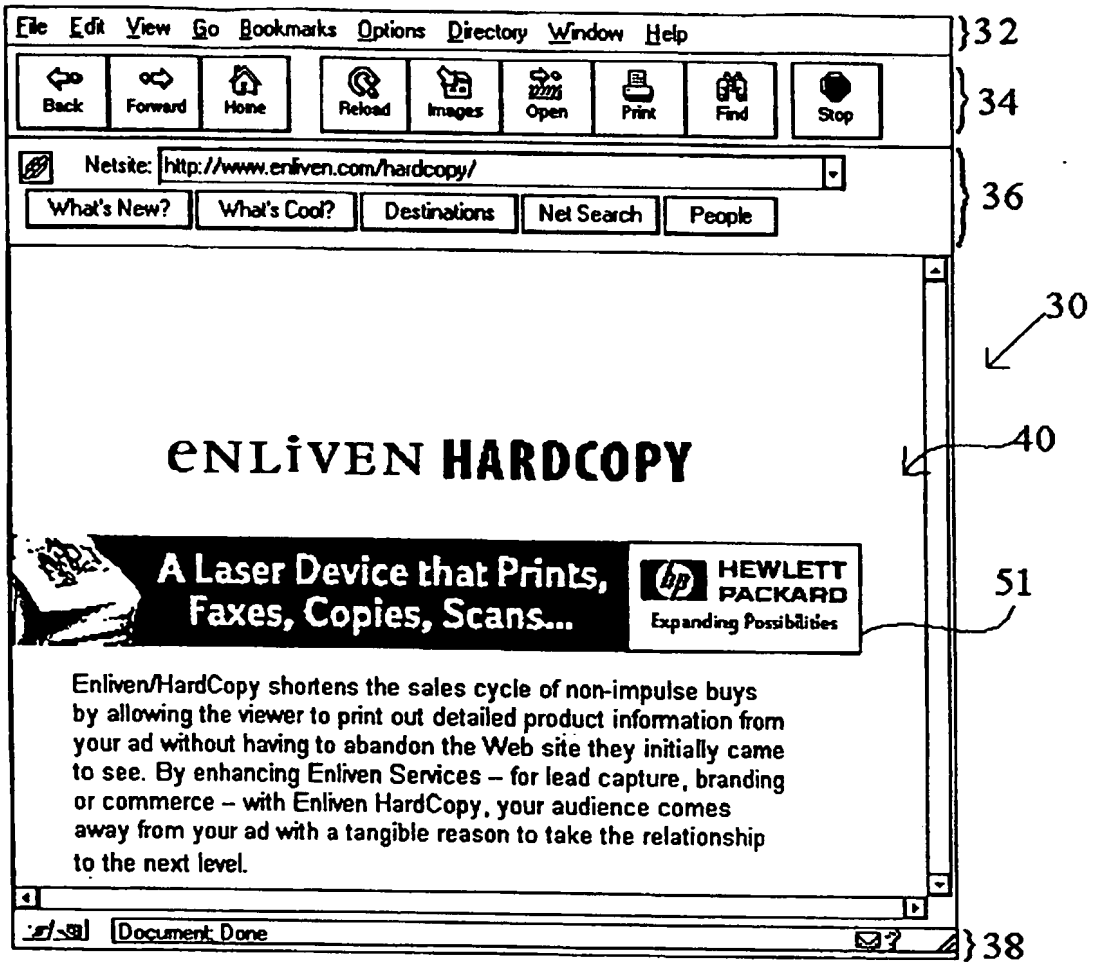

File Edit View Go Bookmarks Options Directory Window Help
32
Back
Forward
Home
Reload
Images
Open
Print
Find
Stop
34
Netsite: http://www.enliven.com/hardcopy/
What's New?
What's Cool?
Destinations
Net Search
People
36
30
ENLIVEN HARDCOPY
40
A Laser Device that Prints, Faxes, Copies, Scans...
HEWLETT PACKARD
Expanding Possibilities
51
Enliven/HardCopy shortens the sales cycle of non-impulse buys by allowing the viewer to print out detailed product information from your ad without having to abandon the Web site they initially came to see. By enhancing Enliven Services – for lead capture, branding or commerce – with Enliven HardCopy, your audience comes away from your ad with a tangible reason to take the relationship to the next level.
Document: Done
38

FIG. 2B

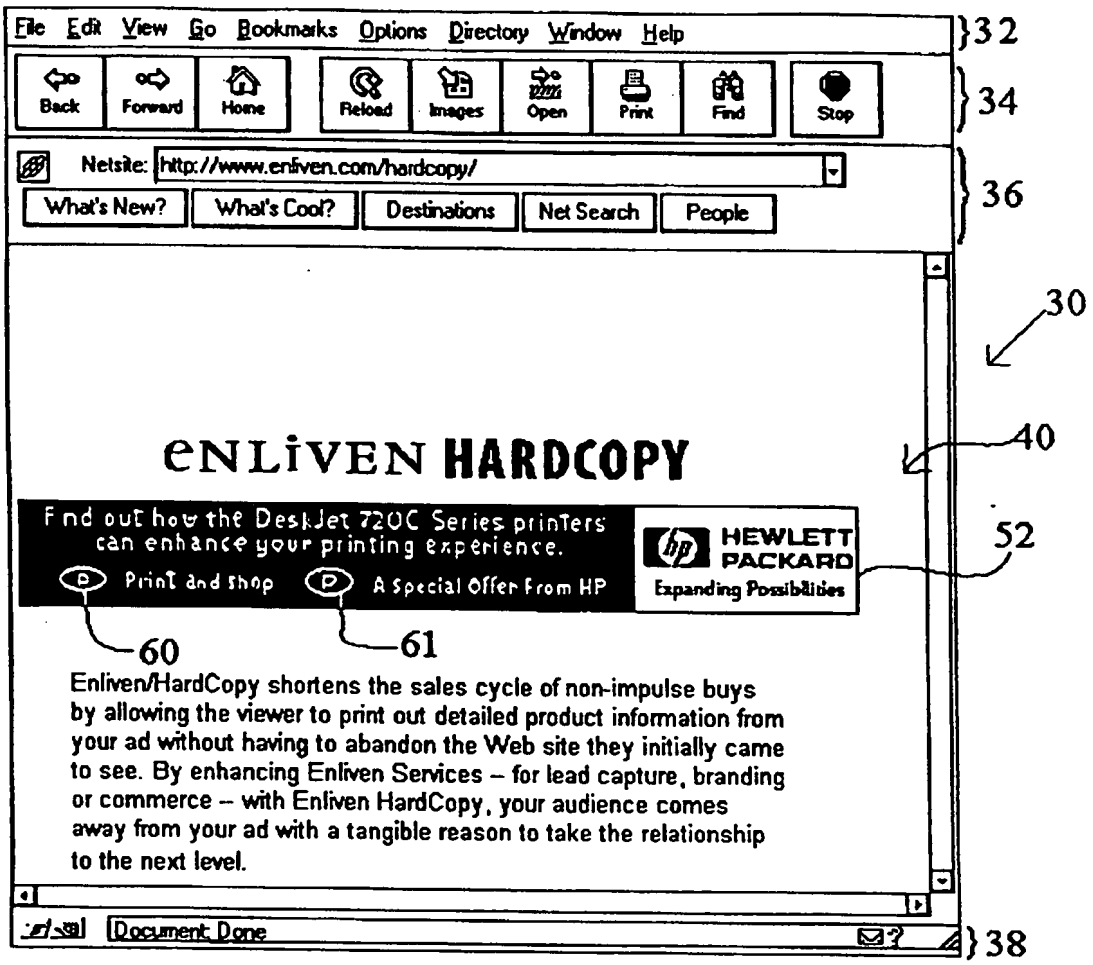

File Edit View Go Bookmarks Options Directory Window Help
32
Back
Forward
Home
Reload
Images
Open
Print
Find
Stop
34
Netsite: http://www.enliven.com/hardcopy/
What's New?
What's Cool?
Destinations
Net Search
People
36
30
ENLIVEN HARDCOPY
40
Find out how the DeskJet 720C Series printers can enhance your printing experience.
Print and Shop
A Special Offer From HP
HEWLETT PACKARD
Expanding Possibilities
52
60
61
Enliven/HardCopy shortens the sales cycle of non-impulse buys by allowing the viewer to print out detailed product information from your ad without having to abandon the Web site they initially came to see. By enhancing Enliven Services – for lead capture, branding or commerce – with Enliven HardCopy, your audience comes away from your ad with a tangible reason to take the relationship to the next level.
Document: Done
38

FIG. 2C

HEWLETT PACKARD
Expanding Possibilities

Let's Celebrate!

A paper bow tie is just the beginning of the fun you can have with your HP DeskJet printer. Because inside every HP Idea Kit is a celebration waiting to burst out.

New baby announcements, wedding invitations, banners and birthday cards. Print out everything you need to celebrate life's important milestones and small victories.

It's all in Let's Celebrate, the new HP Idea Kit, free when you buy any HP inkjet print cartridge. An $80 value, the kit contains great software, special paper samples and two booklets filled with fun ideas and step-by-step instructions.

So print out a paper bow tie and celebrate because, with your HP Idea Kit, life's a party. Look for more HP Idea Kit projects on the Net at http://www.hp.com/go/printideas

HP Idea Kits
If you can imagine it, you can print.

To receive your Let's Celebrate HP Idea Kit: Purchase: Any HP inkjet print cartridge. Fill in: Name and address information at right;
Enclose: 1) This mail-in certificate
2) The UPC symbol (bar code including the numbers 88698) from the HP inkjet print cartridge package
3) A $3 check or money order made out to HP Idea Kits
Mail to:

FREE
with proof of purchase and $3 shipping and handling.

MAIL-IN CERTIFICATE: Offer Expires July 31, 1998

Name _____
Address _____
City _____ State _____ Zip _____
E-mail address _____
What model HP DeskJet printer do you have:
at home? model # at work? model #
May HP contact you with more information?
yes ☐ no ☐



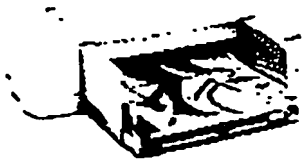
Allow 8 weeks for processing. While supplies last. Offer good in U.S. only and void where prohibited, taxed, or restricted by law. Only purchases by end-user customers from authorized HP resellers qualify for offer. HP reserves the right to request additional information and to confirm identity of submitter. Providing false information disqualifies this claim, and may subject the submitter to criminal prosecution. Order must be postmarked between 3/1/98 and 7/31/98. Only original proofs of purchase (UPC symbols) may be submitted. Limit one kit per household.

FIG. 3

HEWLETT PACKARD
Expanding Possibilities

HP DeskJet 720C Series

BRILLIANT PHOTO-QUALITY PRINTING



HP, the Internet printing leader, now makes it easier to shop smart. Take this printout to your reseller to help you with your important buying decisions.

Features

- Brilliant photo quality and performance on any paper with HP's industry-leading PhotoRetII technology
- Crisp, professional quality black text and vibrant color with HP's patented inks
- Fast printing up to 8 pages per minute in black, 4 pages per minute in color
- Smallest ink drop size which delivers fewer visible dots and more shades of color
- Quietest ink jet printer!
- Sleek, compact design which saves space
- Supports Intel® MMX™ technology for faster color processing

Looking for a high-performance printer that creates great-looking output every time?

Then take a second look at the HP DeskJet 720C and 722C. They give you brilliant photo quality and speed on any paper. Exclusive HP photo resolution Enhancement technology II (PhotoRetII) delivers a smaller ink drop size and more shades of color for clear, vibrant, natural-looking results on any type of paper.

HP ColorSmart II ensures perfect color every time by automatically adjusting color settings, so what you see on screen is what you get on paper. Effortlessly.

The HP DeskJet 720C and 722C both also get your printing done quickly - up to 8 pages per minute in black and 4 pages per minute in color.

The HP DeskJet 720C series printers and specially designed for Microsoft® Windows® 3.1x, Windows95 and Windows NT 4.0 operating systems.

With superior color on any type of paperand fast performance, the HP DeskJet 720C and 722C are the color printers that do it all.

The HP DeskJet 722C includes bonus software to help you with creative projects.*

* The DeskJet 722C is available in North America only.

FIG. 4

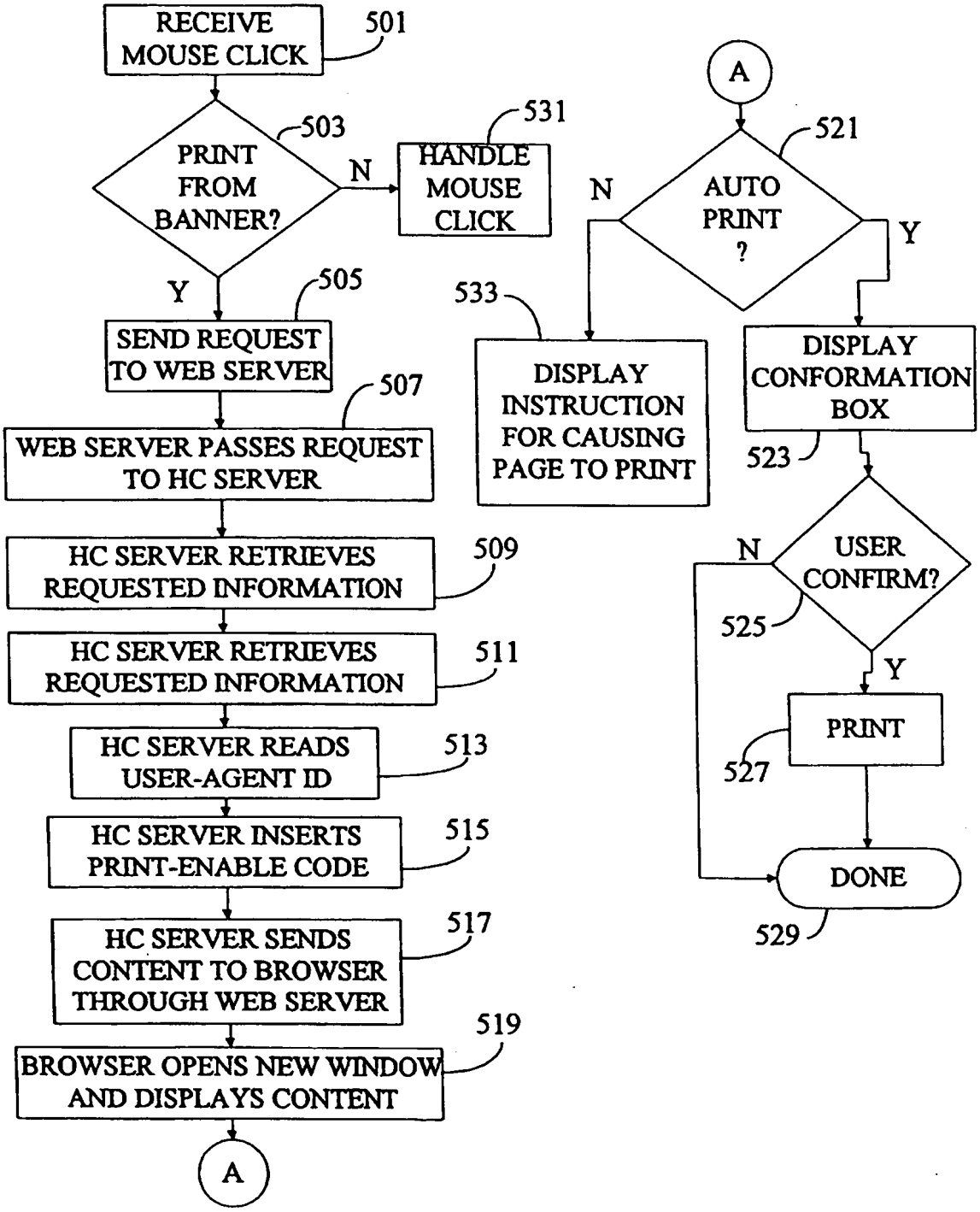

RECEIVE MOUSE CLICK
501
PRINT FROM BANNER?
503
N
HANDLE MOUSE CLICK
531
Y
SEND REQUEST TO WEB SERVER
505
WEB SERVER PASSES REQUEST TO HC SERVER
507
HC SERVER RETRIEVES REQUESTED INFORMATION
509
HC SERVER RETRIEVES REQUESTED INFORMATION
511
HC SERVER READS USER-AGENT ID
513
HC SERVER INSERTS PRINT-ENABLE CODE
515
HC SERVER SENDS CONTENT TO BROWSER THROUGH WEB SERVER
517
BROWSER OPENS NEW WINDOW AND DISPLAYS CONTENT
519
A
A
AUTO PRINT ?
521
N
Y
533
DISPLAY INSTRUCTION FOR CAUSING PAGE TO PRINT
DISPLAY CONFORMATION BOX
523
USER CONFIRM?
N
525
Y
PRINT
527
DONE
529

FIG. 5

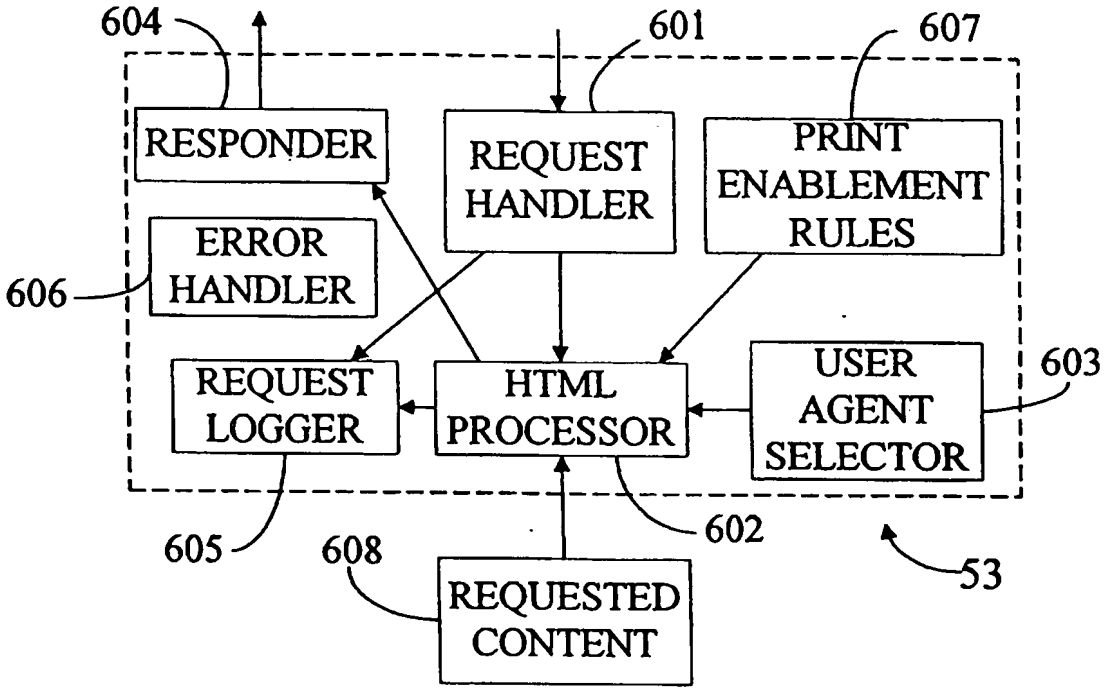

604
601
607
RESPONDER
REQUEST HANDLER
PRINT ENABLEMENT RULES
ERROR HANDLER
606
REQUEST LOGGER
HTML PROCESSOR
USER AGENT SELECTOR
603
605
608
602
53
REQUESTED CONTENT

FIG. 6

2340276

A SYSTEM FOR PRINTING FROM AND CREATING PRINT-ENABLED WEB HYPERMEDIA ADVERTISEMENT BANNERS

Technical Field

This invention relates generally to Web printing and more particular to delivery of printed product information, marketing collateral and other forms of hardcopy output such as coupons, gift certificates and tickets from a Web advertisement banner.

Background of the Invention

The Internet, which started in the late 1960s, is a vast computer network consisting of many smaller networks that span the entire globe. The Internet has grown exponentially, and millions of users ranging from individuals to corporations now use permanent and dial-up connections to use the Internet on a daily basis worldwide. The computers or networks of computers connected within the Internet, known as "hosts", allow public access to databases featuring information in nearly every field of expertise and are supported by entities ranging from universities and government to many commercial organizations. The information on the Internet is made available to the public through "servers". A server is a system running on an Internet host for making available files or documents contained within that host. Such files are typically stored on magnetic storage devices, such as tape drives or fixed disks, local to the host. An Internet server may distribute information to any computer that requests the files on a host. The computer making such a request is known as the "client", which may be an Internet-connected workstation, bulletin board system or home personal computer (PC).

TCP/IP (Transmission Control Protocol/Internet Protocol) is one networking protocol that permits full use of the Internet. All computers on a TCP/IP network need unique ID codes. Therefore, each computer or host on the Internet is identified by a unique number code, known as the IP (Internet Protocol) number or address, and corresponding network and computer names. In the past, an Internet user gained access to its resources only by identifying the host computer and a

through directories within the host's storage to locate a requested file. Although various navigating tools have helped users to search resources on the Internet without knowing specific host addresses, these tools still require a substantial technical knowledge of the Internet.

The World-Wide Web (Web) is a method of accessing information on the Internet which allows a user to navigate the Internet resources intuitively, without IP addresses or other technical knowledge. The Web dispenses with command-line utilities which typically require a user to transmit sets of commands to communicate with an Internet server. Instead, the Web is made up of hundreds of thousands of interconnected "pages", or documents, which can be displayed on a computer monitor. The Web pages are provided by hosts running special servers. Software which runs these Web servers is relatively simple and is available on a wide range of computer platforms including PC's. Equally available is a form of client software, known as a Web "browser" , which is used to display Web pages as well as traditional non- Web files on the client system. Today, the Internet hosts which provide Web servers are increasing at a rate of more than 300 per month, en route to becoming the preferred method of Internet communication.

Created in 1991, the Web is based on the concept of "hypertext" and a transfer method known as "HTTP" (Hypertext Transfer Protocol). HTTP is designed to run primarily over TCP/IP and uses the standard Internet setup, where a server issues the data and a client displays or processes it. One format for information transfer is to create documents using Hypertext Markup Language (HTML). HTML pages are made up of standard text as well as formatting codes which indicate how the page should be displayed. The Web client, a browser, reads these codes in order to display the page.

Each Web page may contain pictures and sounds in addition to text. Hidden behind certain text, pictures or sounds are connections, known as "hypertext links" ("links"), to other pages within the same server or even on other computers within the Internet. For example, links may be visually displayed as words or phrases that may be underlined or displayed in a second color. Each link is directed to a web page by using a special name called a URL (Uniform Resource Locator). URLs enable a Web browser to go directly to any file held on any Web

rver. A user may also specify a known URL by writing it directly into the command line on a Web page to jump to another Web page.

The URL naming system consists of three parts: the transfer format, the host name of the machine that holds the file, and the path to the file. An example of a URL may be:

```
http://www.hp.com/peripherals/main.html
```

where "http" represents the transfer protocol; a colon and two forward slashes (://) are used to separate the transfer format from the host name; " www.hp.com" is the host name in which " www" denotes that the file being requested is a Web page; " /peripherals/" is a directory name in a tree structure, or a path, on the host machine; and "main.html" is the file name with an indication that the file is written in HTML.

The Web has become a very successful means of communication between central sites connected to the Internet and individual users on the Internet who wish to communicate with the site. The communications are controlled by two programs, a Web Browser that runs on the user's computer and a Web server that runs on the site's computer. A Web Browser sends a request to a Web Server using the HTTP protocol. A request results in a MIME ("Multipurpose Internet Mail Extensions"-see IETF RFC1341, 1342, 1521) Stream being sent back to the Web Browser. The MIME stream includes a Content Type header for the data that indicates how the Web Browser will treat the data being sent. For example, a "text/html" MIME type indicates that the data is in the hypertext markup language (HTML), and should be interpreted accordingly; an "image/gif" MIME type indicates that the data is a "gif" image file, and should be rendered as an image after unpacking the data in the file.

The Web server typically services a request either by sending back a file stored locally on the server or by running a program, the output of which is the MIME stream to be sent back to the browser. As noted above, the Web typically makes use of the hypertext format to display information to a user and receive input from the user. Hypertext allows a body of information to be organized into a hierarchical system in which the user can pursue increasing levels of specificity by following the various hypertext links from one document to the next. A typical hypertext text display system (a Web Browser) displays a document in which selected words or phrases are highlighted. The highlighted phrase indicates that

another document related to that phrase is in the system. If the person viewing the document selects one of these words or phrases by pointing and clicking using a pointing device, the second document related to that word or phrase is sent to the user's screen. The user may return to the original document at any time selecting a "back" option on the viewer screen.

This form of information display has found wide acceptance on the Internet because of its ease of use. A user located at a terminal on the network connects to a server on the network that has a "home page" in hypertext format. The home page is then displayed on the user's screen by the browser. When the user selects a highlighted word, the browser communicates the user's choice to the server in a MIME data stream. The server then transfers the corresponding file to the user's machine via the network. The browser on the user's machine then displays this file to the user.

Conventional browser's also allow the user to input text on the user's screen which is then transferred to the server when the user selects a graphical element such as a "button". Hence, the user can communicate information to the server beyond the predefined hypertext link information, provided the server is programmed to use this information.

The hypertext mode of information organization is also efficient from the point of view of the home page provider on the server. A home page is written in HTML. HTML is a word processing format which allows the user to define a page as the user would with a conventional word processor. In fact, programs for converting the various conventional word processing formats to HTML are commercially available. For each phrase that is to provide a link, the user marks the phrase by enclosing it with beginning and ending "tags". The user then defines another hypertext file that contains the document to be displayed in response to the user selecting the phrase. Hence, a server program can be as simple as a set of HTML documents created with a conventional word processing system and stored on the server.

If the interaction between the user and server is basically a transfer of predefined information which is static in nature, the simple "set of documents" mode is satisfactory. If, however, the information to be transferred requires some form of processing prior to the transfer, the simple hypertext engines are less than

eal. Consider an application in which the server must execute a program to gather and calculate the data that forms a portion of hypertext material that is to be returned to the user. To provide such a service, the server must include a program that is specific to the application and which performs the computations and then generates the results in the form of a hypertext document that is delivered on the network. The HTTP Protocol defines a general mechanism for programs to operate in this way, called the Common Gateway Interface (or CGI). A program that uses this mechanism is often referred to as a CGI Program.

The interaction between web servers and web browsers across the IP network provides a relatively easy and increasingly popular means for accessing remote information. However, the process of navigating through this information in conventional web pages is a linear process. Web pages provide links that correspond one-to-one with other web pages and resources. Thus, one action inside the web page (e.g., a mouse click) can initiate one link to another web page.

One of the means for enhancing a web page is the use of an executable program attached to web page which is downloaded to and executed by the web browser along with the associated web page, These executable programs are commonly referred to as applets and are constructed from a programming language which is executable by the web browser. Once executed by the web browser, the applet provides programmed functionality. For example, the JAVA programming language established by SUN MICROSYSTEMS provides a means for creating JAVA applets which can be attached to web pages to provide enhanced functionality for the displayed web page. One example of a function created by applets is animating an image to produce moving objects on the web page. Applets have also been used to create executable spots in a web page such that graphics on that spot animate when a mouse pointer is moved over the targeted area. An additional function created by applets is to generate and display a separate window on top of a web page in response to a mouse click inside the web page. Such a window can provide a menu bar across the top of the window and provide user options within that window, but it is not within the web page itself. There are, of course, a number of other functions that can be implemented using applets in association with web pages. However, conventional web pages and applets have not altered the linear navigation process.

JAVA is a strongly typed object-oriented language with a C like syntax. The JAVA compiler and run-time code mechanisms enforce type safety so that there can be no wild pointers or other references that violate the language's type system. So for example, there is no "void *" and all casts are validated at runtime.

The JAVA language is typically compiled to machine-independent byte-codes and then a JAVA virtual machine interprets those byte codes in order to execute the JAVA program. JAVA can be integrated into web browsers, so that as part of viewing a document one can down-line load a set of JAVA byte-codes and then execute them on the client machine. Because JAVA is completely typesafe the client browser can feel confident that the JAVA program can be executed safely without endangering the security or integrity of the client. JAVA is more fully described in "The JAVA Language Specification", by Sun Microsystems, Inc. which is hereby fully incorporated herein by reference.

Scripted language systems like JAVA generate JAVA programs that are designed to be portable and to be deployed in a variety of different environments. It is therefore desired to allow JAVA programs to use different ORBs (Object Request Brokers) without requiring any changes to the JAVA program. Because the generated stubs are part of the JAVA program it is necessary that the stubs be ORB-independent so that the JAVA program and its associated stubs might be used in any of a multiplicity of ORBs.

Further technical background includes: Developing Client/Server Applications, by W. H. Inmon, QED Publishing Group of Wellesley MA, 1993; RPC for NT, by Guy Eddon, R&D Publications of Lawrence KS, 1994; and Object-Oriented Languages, Systems and Applications, edited by Gordon Blair, et al., Halsted Press of New York NY, 1991; Advanced Windows NT, by Jeffrey Richter, Microsoft Press of Redmond WA, 1994; Learn JAVA++ Now, by Stephen R. Davis, Microsoft Press of Redmond WA, 1996; HTML 3.2 and CGI Unleashed, by John December and Mark Ginsberg, Sams Publishing 1996; and the bibliographic references contained therein.

Advertising is becoming more prevalent on the internet and in particular in the WWW. However, with the present linear navigation process, an advertiser must make the potential customer navigate through several layers of web

ages to finally present to the potential customer the information the potential customer wants. Some of the more popular and frequently visited sited have banner adds that change frequently. Prior to the present invention, clicking on a banner generally took the web surfer to the home page of the business. It was then left up to the web surfer to successfully navigate to the Web to find the proper information.

Summary of the Invention

The present invention provides a method of providing a printable page. First, a hardcopy request for the printable page is received from a user agent. Next, information is retrieved to create the printable page. The information is formatted based on the user agent. The necessary print enabling code are embedded into the printable page. Finally, the printable page is sent to the user agent.

Brief Description of the Drawings

A better understanding of the invention may be had from the consideration of the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a block diagram of a web server and a web browser in a network.

FIG. 2 illustrates a web page including an hypermedia advertisement banner in accordance with the teachings of the present invention.

FIG. 3 illustrates a sample printout created as a result of a selection from a 'print-from-a-banner' enabled region/object.

FIG. 4 illustrates a sample printout created as a result of a selection from a 'print-from-a-banner' enabled region/object.

FIG. 5 is a flow chart of a system for generating a hardcopy output as a result of a selection from a 'print-from-a-banner' enabled region/object.

FIG. 6 is a block diagram of a hardcopy server in accordance with the present invention.

Detailed Description Of The Preferred Embodiments

The present invention is not limited to a specific embodiment illustrated herein. The present invention is a comprehensive solution for creating

t-enabled JAVA applet advertisement banners, delivering and tracking print content authored in HTML (and Cascading Style Sheets (CSS)), and providing the best possible print output and user-experience. The printed content is authored in HTML and is constrained by the limitations of the web browser's ability to render HTML to the selected/default printer. There are currently two kinds of printable content: HTML content that does not change and HTML content that will change with each session or for each user. With the present invention, a Web user and host get one-click request (without the need for click-through) from the Web advertisement for high quality printed content; Direct Web delivery of printed product literature, personalized information, sales receipts, invoices, purchase orders/confirmations, bar codes, coupons, gift certificates, and tickets without the need to build a Web site; Automated selection of the optimal delivery and presentation method for printed content based on the capabilities of the end-user's Web browser, computer platform and operating system; Measurement and tracking of printed collateral deliveries; and No additional Advertiser/advertising agency development work is needed beyond that of developing the creative (the Hypermedia banner) and the content to be printed.

This is accomplished through technical extensions to advertisement banners (JAVA applets) to enable making multiple single-click print requests from a single banner in a client-server architecture that can be extended to support dynamically generated printed content. The preferred embodiment of the present invention supports a broad range of printers to deliver print capabilities within Web ads. Uses for the present invention include printing the following: order confirmation forms from within e-commerce ads, product specification sheets , mail-in certificates and other marketing materials, and dealer listings and store locations when an onsite visit is necessary to facilitate a purchase decision.

Referring now to FIG. 1 there is a simplified block diagram of a web server 18 and a web browser 24 in an IP (internet protocol) network 16. IP network 16 can be, for example, the public Internet or a private intranet, and host system 12 and user system 14 can communicate across IP network 16 using a hyper-text transfer protocol (HTTP).

Host system 12 and user system 14 can be, for example, a personal computer or computer workstation, and generally include a data storage device, a

emory device, a processor and a display. The memory device in host system 12 can store code for and the processor can execute web server 18. The data storage device in host system 12 can store a web page 20 and an associated applet 22 and hypermedia object 56. Web page 20 can be written in the hyper-text mark-up language (HTML), and applet 22 can be written in an interpretive language such as JAVA. Hypermedia object 56 may take many forms such as GIF, JPEG, REAL VIDEO, MPEG or ENLIVEN movies and may require its own server (not shown). Analogous to host system 12, the memory device in user system 14 can store code for and the processor can execute a web browser 24. The memory device in user system 14 can store a downloaded web page 26 and an associated applet 28 and hypermedia object. Web browser 24 is an applet and applet script capable web browser and can both display web page 26 and execute applet 28.

In operation, a user of user system 14 can use web browser 24 in order to transmit a request for web page 20 across IP network 16. The request can be, for example, a URL (uniform resource locator) for web page 20. Web server 18 can receive the request from web browser 24 and, in response, can package and transmit web page 26 and applet 28 to web browser 24 across IP network 16. Web server 18 packages web page 26 and applet 28 based upon web page 20 and applet 22 stored on host system 12. After downloading web page 26 and applet 28, web browser 24 can display web page 26 to a user of user system 14 and can execute applet 28. Applet 28 only needs to be downloaded once and is executed by web browser 24. When a link is selected in web page 26, web server 18 is sent a request across IP network 16 and can transmit the selected page. The execution of applet 28 by web browser 24 can provide enhanced functionality to web page 26. The applet may initiate a request for a URL based on user interaction.

FIG. 2 illustrates an a web page that includes an hypermedia advertisement banner 50-52. As shown in FIG. 2, a display window generated by web browser 24, indicated generally at 30, can include a menu bar 32 and a plurality of buttons 34 each providing one of various functions for a user of web browser 24. Display window 30 also includes a location field 36 which serves a dual function of indicating the URL of the current location and of allowing a user to enter a new destination URL. In the illustrated example, web browser 24 is being used to navigate the public Internet, and the URL shown in location field 36 is the

of a web page on the world wide Web. Display window 30 further includes a status bar 38 that provides information about the operation of web browser 24. The items in menu bar 32 and buttons 34 and the general layout of display window 30 as shown in FIG. 2 are common features of the NETSCAPE NAVIGATOR web browser available from NETSCAPE COMMUNICATIONS.

Display window 30 includes a displayed web page, indicated generally at 40, which is generated by web browser 24 from the downloaded web page 26 and associated applet 28. Displayed web page 40 provides the user of web browser 24 with the information content accessed from web server 18. The user generally interacts with display window 30 and displayed web page 40 using a pointer device (e.g., a mouse) which controls the position of a pointer 42 and allows a user to initiate actions (e.g., through a mouse click). According to the teachings of the present invention, displayed web page 40 includes snap shots of frames from a single interactive hypermedia JAVA applet banner advertisement 50, 51 and 52 in FIG. 2A, 2B and 2C respectively. This interactive hypermedia banner is provided from hypermedia object 56 as shown in FIG. 1. If the web browser 24 senses a mouse click over area 60 in FIG. 2C, then, in accordance with the present invention, the page as shown in FIG. 4 is printed on printer 54. If the mouse click is over 61, then the page as shown in FIG. 3 is printed on printer 54. Thus, from FIG. 2C it is possible to request more than one type of printed content from the single banner. In particular, a user can print a product sheet (FIG. 4) or a mail-in certificate (FIG. 3).

FIGs. 3 and 4 are both examples of pages with information that does not change. There are three types of content that can be delivered for printing: (1) content that does not change; (2) dynamically generated content, such as a personalized brochure; and (3) secure content – content that has monetary value and is not feasible to duplicate. This system has been designed to immediately provide the first two kinds of content and, when technically feasible, provide the third kind of content.

The following HTML code is for a page that does not change content. The result of the HTML shown is pictured in FIG. 4. The HTML below includes the print-enabling script that is inserted by the HC server 53.

```
<HTML>
<HEAD>
<!--*** Start of section inserted by Enliven/HardCopy ***-->
```

```
<META http-equiv NAME="Cache" CONTENT="No-Cache">
<SCRIPT LANGUAGE="VBScript"><!--
On Error Resume Next
sub EnlivenPrint
    On Error Resume Next
    thebrowser.ExecWB 6, 1
end sub
-->
</SCRIPT>
<OBJECT ID="thebrowser" WIDTH=0 HEIGHT=0
CLASSID="CLSID:8856F961-340A-11D0-A96B-00C04FD705A2">
</OBJECT>
<SCRIPT LANGUAGE="JAVAScript1.2">
function EnlivenPrint()
{
    window.print();
}
</SCRIPT>
<!--End of section inserted by Enliven/HardCopy-->
<TITLE>HP720C Series Printers</TITLE>

<STYLE TYPE="text/css">

    .features {
        font-weight: normal;
        font-size: 10pt;
        line-height: 12pt;
        font-family: "times new roman";
        font-variant: normal;
        font-style: normal;
    }

    .writeup {
        font-weight: normal;
        font-size: 9pt;
        line-height: 12pt;
        font-family: "times new roman";
        font-variant: normal;
        font-style: normal;
    }
</STYLE>

<HEAD>

<!--*** Start of section modified by Enliven/HardCopy ***-->
<BODY BGCOLOR="#ffffff" ONLOAD="EnlivenPrint()">
<!--End of section modified by Enliven/HardCopy-->

<TABLE BORDER=0 CELLSPACING=0 CELLPADDING=0 WIDTH=590 ALIGN=CENTER>

<!-- DJ image row -->

<TR>
    <TD WIDTH="30" VALIGN="TOP" COLSPAN="4" ALIGN="CENTER">
        <IMG SRC="hp720c.gif">
    <TD WIDTH="155" VALIGN="TOP"> 
    <TD WIDTH="40" VALIGN="TOP"> 
    <TD WIDTH="365" VALIGN="TOP"> 
</TR>


<!-- Heading and Content rows (Content uses tables within tables for
layout) -->

<TR>
    <TD WIDTH="30" VALIGN="TOP" COLSPAN="2">
```

```
        <P><B>Features</B>

    <TD WIDTH="40" VALIGN="TOP" ALIGN="CENTER" ROWSPAN="9">
        <IMG SRC="border.gif">

    <TD WIDTH="365" VALIGN="TOP" ROWSPAN="9">

        <P><B>Looking for a high-performance printer that creates
great-looking output every time?</B>
        <P class="writeup">
        Then take a second look at the HP DeskJet 720C and 722C.
They
        give you brilliant photo quality and speed on any paper.
Exclusive
        HP photo resolution Enhancement technology II (PhotoRetII)
delivers
        a smaller ink drop size and more shades of color for clear,
vibrant,
        natural-looking results on any type of paper.
        <P class="writeup">
        HP ColorSmart II ensures perfect color every time by
automatically
        adjusting color settings, so what you see on screen is what
you
        get on paper. Effortlessly.
        <P class="writeup">
        The HP DeskJet 720C and 722C both also get your printing
done
        quickly - up to 8 pages per minute in black and  4 pages per
minute
        in color.
        <P class="writeup">
        The HP DeskJet 720C series printers and specially designed
for
        Microsoft&#174; Windows&#174; 3.1x, Windows95 and Windows NT
4.0 operating
        systems.
        <P class="writeup">
        With superior color on any type of paperand fast
performance,
        the HP DeskJet 720C and 722C are the color printers that do
it
        all.
        <P class="writeup">
        The HP DeskJet 722C includes bonus software to help you with
creative
        projects.*

        <P class="writeup" ALIGN="RIGHT">
        * The DeskJet 722C is available in North America only.</P>
</TR>

<TR>
    <TD WIDTH="30" VALIGN="TOP">
        <IMG SRC="checkmark.gif">
    <TD WIDTH="155" VALIGN="TOP">
    <P class="features">Brilliant photo quality and performance on
any paper with HP's
    industry-leading PhotoRetII technology

<TR>
    <TD WIDTH="30" VALIGN="TOP">
        <IMG SRC="checkmark.gif">
    <TD WIDTH="155" VALIGN="TOP">
    <P class="features">Crisp, professional quality black text and
vibrant color with
```

```
            HP's patented inks

        <TR>
            <TD WIDTH="30" VALIGN="TOP">
                <IMG SRC="checkmark.gif">
            <TD WIDTH="155" VALIGN="TOP">
            <P class="features">Fast printing up to 8 pages per minute in
        black, 4 pages per minute
            in color

        <TR>
            <TD WIDTH="30" VALIGN="TOP">
                <IMG SRC="checkmark.gif">
            <TD WIDTH="155" VALIGN="TOP">
            <P class="features">Smallest ink drop size which delivers fewer
        visible dots and more
            shades of color

        <TR>
            <TD WIDTH="30" VALIGN="TOP">
                <IMG SRC="checkmark.gif">
            <TD WIDTH="155" VALIGN="TOP">
            <P class="features">Quietest ink jet printer!

        <TR>
            <TD WIDTH="30" VALIGN="TOP">
                <IMG SRC="checkmark.gif">
            <TD WIDTH="155" VALIGN="TOP">
            <P class="features">Sleek, compact design which saves space

        <TR>
            <TD WIDTH="30" VALIGN="TOP">
                <IMG SRC="checkmark.gif">
            <TD WIDTH="155" VALIGN="TOP">
            <P class="features">Supports Intel&#174; MMX&#8482; technology
        for faster color processing

        </TABLE>

        <!--*** Start of section inserted by Enliven/HardCopy ***-->
        <SCRIPT LANGUAGE="JAVAScript">
            defaultStatus = status = "Close me."
            setTimeout('self.close()', 30000);    //WARNING: do not set this
        lower than 1000!
        </SCRIPT>
        <!--End of section inserted by Enliven/HardCopy-->

        </BODY>
</HTML>
```

The following HTML sample is an example of a receipt generated for a purchase that was made from a banner. Special tags representing information provided from the banner to the Hardcopy server 53 are indicated in bold. The default source for the information to be inserted is the banner but the tag encoding scheme can be extended to provide any number of name-value pairs (parameters) separated by ';'. Other foreseeable tag parameters are SOURCE and STYLE. The SOURCE parameter would reference a URL or a local content generater such as an application that generates a bar code image. The STYLE parameter would reference a predefined CSS class.

```
<HTML>
<TITLE>1-800-Flowers Receipt</TITLE>
<HEAD>
<BODY>
<H1>1-800-Flowers sales receipt for <!--
Enliven;FIELD="CustomerName"--></H1>
<P>Keep this receipt as for your records.
<P>You have ordered <!--Enliven;FIELD="Quantity"--> of
<!--Enliven;FIELD="ProductName"--> for a total of <!--
Enliven;FIELD="Total"-->.
<P>Your order confirmation number is <!--
Enliven;FIELD="Confirmation"-->.
<P>Thank you for your order.
</TABLE>
</BODY>
</HTML>
```

With that high level explanation, a more detailed description of the preferred embodiment follows. Referring now to FIG. 5, where a flow chart showing the overall system view of the preferred embodiment of the present invention is shown. Assuming that the banner has an embedded request, such as an HTTP GET request, an HTTP POST, or a JAVAScript 'window.open()' call associated with the active area. This request is directed to the Hardcopy server 53, which returns the HTML content(s) to be printed. The Hardcopy server 53 and web page 20 reside on a hosted web server, but necessarily the same web server.

When web browser 24, or the banner itself, receives a mouse click (501) it checks (503) if the click is on the 'print-from-a-banner' enabled region/object. If not then the mouse click is handled elsewhere 531. If the click is on the 'print-from-a-banner' enabled region/object of the banner, the request is sent (505) to web server 18 over the IP network 16. Web server 18 passes (507) the request to the Hardcopy server 53. HC server 53 reads in the template/content specified by the URL 511. Based (513) on the type of browser (the 'User-Agent' id in the HTTP GET request header), the HC server 53 automatically inserts (515) the appropriate combination of HTML, JAVAScript, and/or VBScript. The HC server 53 also decides at this point what represents the best possible alternative for the current browser and platform. With the content now properly prepared, it is sent (517) to the browser 24 via web server 18 and IP network 16.

The Browser temporarily opens (519) a new window containing the content to be printed. This is a 'pop-up' window that will self-close after a timeout period of a few seconds – sufficient time to initiate a print-job on the user's computer. If (521) the browser 24 can support automatic printing then a print confirmation dialog will also appear 523. The user must click 'Yes' or 'Ok' to

mplete the print request. This is done so that the user has a chance to set the printer properties or to choose a non-default printer/fax. If (521) the browser does not support automatic printing then instructions for manually printing the new web page are displayed (533) in a pop-up window or in the page itself. Not all browsers can support a pop-up.

The present invention system is designed so that future technical improvements can be included as modules within the system. The client-server design isolates clients from the task of appropriate print content selection and delivery optimization. The present invention is designed so that the high-quality print material, the rules for automatically print-enabling content, and the technology for making the print request from a banner are three separate entities that may be changed at any time without affecting the function of the others.

As briefly described above, the HC server 53 automatically print-enables the printed material based on the user agent id string. Among the various user agents (i.e., web browsers) today there are great differences in support and implementation of the different kinds of Web technologies. For instance, there are significant variances in how different Web browsers render HTML and CSS on screen and also to the printer. These differences exist even for similar types of Web browsers that exist on different platforms. There are also big differences in JAVAScript support among the different Web browsers. The HC server 53 mediates all these constraints.

The HC server 53 is an add-on to an web server 18 (also referred to as HTTP server). The HC server 53 automatically injects the necessary print-enabling code into a page developed with current HTML Document Type Definition (DTD) and CSS specifications. In the preferred embodiment, the HC server 53 is implemented as CGI or as dynamically loaded modules (NSAPI or ISAPI) within the web server process. All actions taken by the HC server 53 are conducted in accordance with the most recent W3C Technical Recommendations and Technical Reports on HTTP and HTML.

Referring now to FIG. 6, the HC server 53 consists of the following modules: a request handler 601, an HTML processor and print-material builder (this includes handling of the special field tags for real-time data) 602, user agent selection rules 603, print-enablement rules 607, a request logger 605, an error

handler 606, and a responder 604. Functional descriptions of each module are provided in the following sections.

Request handler 601 receives the entire request that is made from the banner to the HTTP server. Request handler 601 determines if the request is an HTTP GET or an HTTP POST and then decodes the information contained in the request for all the other modules. The error handler 606 is called if any errors are encountered here.

The HTML processor and print material builder 602 is the major functional block. This module processes, for eventual delivery by the responder module 604, contents 608 authored by the advertiser or the advertiser's agency in HTML, CSS, GIF, JPEG, or XML or some other as yet defined format. Requests made from print-capable user agents ,as determined by the user agent selector rules 603, are provided with the JAVAScript/VBScript/HTML combination for automatically printing the HTML page once the page is loaded in the web browser. The HTML processor 602 also inserts the necessary JAVAScript to timeout and close the window containing the printed material.

The content 608 is print-enabled with the best means possible by the HC server 53. There are currently no predefined methods or standards for printing that are consistent for all Web browsers. Thus for each Web browser version, empirical data must be collected to determine the most reliable method for initiating a print job with minimal user-interaction requirement and minimal visual elements.

There are several methods used to trigger the print-job at the client's user-agent. One implementation of a print-job trigger is accomplished by embedding a function call to the <BODY> tag in the HTML page to be printed. Where supported, printing will be initiated once the page loads. This is accomplished by calling the print-job routine in the 'onload' event tag within the <BODY> tag. Another implementation of a print-job trigger is to upload a single-pixel image with a call to a JAVAScript/VBScript print routine at the end of the print material (the HTML file).

For printed material that contains information that changes, there is provided a scheme that encodes the field names, data sources, value data types, and presentation rules within special tags used in a template for representing real-time generated information. Field values can be specified by the user of the banner

r come from any other source available to the HC server 53. The HTML processor 602 inserts the appropriate HTML for each real-time field tag it encounters. Refer below for an example of a dynamic page.

Support for integrating dynamically determined (real-time) content into templates should be implemented as external modules that are added onto the standard HC server 53. This means that the custom code required to support the printed content with real-time or personalized information should simply be attached or referenced as modules of the standard HC server 53. Preferably, a scheme that isolates the request from having specific knowledge of the corresponding module should be used. In cases where information to be printed is provided by the user of the banner, the request must provide the values for the fields defined in the template. In cases where information to be printed comes from a third source, the HC server 53 must have network or local access to the information/data generator.

Through the User agent selector 603, the user's Web browser (user-agent) is identified (by the server component) from the 'User-Agent' header element in the HTTP GET/POST request. Presently, only Netscape 4.x and Microsoft Internet Explorer 4.x Web browsers support initiating a print-job directly from within an HTML page. Netscape 4.x Web browsers which support JAVAScript 1.2 can be print-enabled using the 'window.print()' call and Microsoft Internet Explorer 4.x Web browsers for 32-bit Windows can be print-enabled using OLE to execute the 'Web Browser print command.' This is achieved through a combination of VBScript and the <OBJECT> tag. This combination is ignored in JAVAScript. The HTML processor 602, in cooperation with the user agent selection 603 provide the correct CLASSID corresponding to the version (and platform) of Internet Explorer the user has. The print-enablement routines generated by the HTML processor will continue to evolve with future innovations/improvements in HTML and Web browser scripting.

If the user agent selector 603 identifies the user agent as a non-print-capable browser, then the HTML processor 602 must provided instructions on manually printing the resulting HTML page. Depending on the capability of the Web browser, these instructions can be displayed by any of the following means:

in an intermediate HTML page which redirects to the printed content;

in an intermediate HTML page which provides a link to load the printed content;

in an HTML frameset which loads the printed content in one frame and displays the printing instructions in another frame; or

in a pop-up window that is launched from within the window containing the content to be printed.

Measuring and reporting the delivery of the printed material is an important part of the present invention. The request logger 605 logs:

Total number of print requests to date for each piece of content;

Total number of print requests to date for each site; and

Most requested piece of content for each site.

The report will also include a total for all the print deliveries in the campaign. For all totals the percentage delivered to print-capable browsers will be also be provided. One skilled in the art will understand that other statistical data can be logged and reported.

Responder 604 module transmits back to the requestor (the client's user-agent) the processed printed material (as HTML) along with the appropriate HTTP header. If an error occurred during processing, an HTTP error header with the status code of 203 is sent instead.

Now that the server has been described in detail, the client is relatively simple. As used here, the client is the banner that is print-enabled by inserting a Hardcopy server request as described herein. The banner can take the form of a Macromedia Director file or a GIF 89a format image/animation but is not limited to only these multimedia formats. One type of banner presently in use is trade named ENLIVEN by Narrative.

The client is usually delivered to the host systems by an ad rotation engine or by an ad targeting engine as known in the industry. The client is embedded by either type of engine (as an HTML fragment) into the HTML page served from a publisher Web site to the user agent.

The banner may take many forms, however, in the preferred embodiment, the banner is a JAVA applet which is embedded by the APPLET or the OBJECT tag. The HTML embedding the Enliven banner must specify that the JAVA

)plet requires "scripting privileges." E.g. adding the "MAYSCRIPT" directive to an APPLET tag.

As stated above, a 'print-from-a-banner' has an embedded request, such as an HTTP GET request, an HTTP POST, or a JAVAScript 'window.open()' call associated with an active area. This request is directed to the Hardcopy server 53, which returns the HTML content(s) to be printed. For a request made from a banner using the HTTP GET method, the filename of the source HTML is passed in the QUERY_STRING environment variable and the directory containing the source HTML is passed in the PATH_INFO environment variable. For example, for a banner that prints a coupon as shown in FIG. 3, a directory `/hardcopy/hp722c/` is created from the document root of the hosting HTTP server (e.g. someserver.narrative.com). The source file (or template, if there is real-time data involved) named "coupon.html" (for instance) is placed in the host HTTP server as `/hardcopy/hp722c/coupon.html`. Any associated image files are also placed in this directory. The Hardcopy server 53 (written as CGI in this case) is placed in the path `/hardcopy/enlivenhardcopy.cgi`.

The button which is clicked to print the coupon on the banner is configured to request the URL,
`http://someserver.narrative.com/hardcopy/enlivenhardcopy.cgi/hp722c?coupon.html`.
Thus, the browser simply requests the page when the user clicks on that region.

Optimizing for print is not the same as optimizing for screen. The rules for determining what is optimal for each type of Web browser are derived empirically. Some of the guidelines presently used to test print material are:

Delay between the print content request and the response must be minimized or well within common end-user expectations. In general, the total file size of the content to be printed may not exceed a size that would require longer than a one-minute download time. The parameters for this time limit are based on averages of typical business and home-user network throughput measures.

Fidelity of the printed material must be made as close as possible to what an actual traditionally published brochure or coupon would look like. Limitations of current Web presentation and

layout technologies must be taken into consideration. The constraint on time delay should supercede this requirement.

Quality of the printed output is measured by comparing the visual quality against the best possible output from the latest HP LaserJet and HP DeskJet printers. The best possible quality output for a printer is defined as the printed matter which clearly indicates print technology enhancements such as photo-realistic color or anti-aliased font rendering). Optimal quality is achieved when the above two requirements are satisfied resulting in the best possible output from the test printers used.

While it is not possible to algorithmically define the process for creating the 'optimal' printed page, experimentation has revealed a set of print-material authoring guidelines (below) that will in most cases produce printed output from a banner which satisfy the requirements listed above.

Using JPEG images whenever possible allows for higher quality printed images than GIF or PNG. Nonetheless, use of JPEG images should be balanced against the typically larger file size of JPEG images compared to GIF or PNG.

It is still necessary to create a supplementary page as a single GIF or JPEG image because many older Web browsers cannot support the level of presentation required for decent printed content from HTML. The supplementary page can be created as a snapshot from the high-quality HTML/CSS/XML page.

Bitmapped images of fonts may look fine on screen but tend to look terrible when printed. Users expect much better visual quality on paper. Therefore, it is better to minimize use of type styles and instead be more creative with layout until Web presentation technology improves.

Presentation, positioning, style, and layout will be done with HTML tables and CSS to improve the print quality. Tables should be specified according to fixed dimensions although table elements should be specified in relative dimensions. Font sizing and style should be specified with CSS.

Referring briefly back to FIG. 1, it should also be understood that web server 18 and the web browser 24 may access other web servers 9 to generate web page 26. For example, web browser 24 may request a web page 26 that is

sident on web server 9. The banner comes as hypermedia object 56. Upon clicking on the banner page, the browser is linked to web server 18 and in particular to HC server 53. As HC server 53 prepares the printable page, the HC server 53 may request information of any number of other web servers. Thus, several servers are present, in the simplified example of FIG. 1 there is a web server 18 and hardcopy server 53. There is no requirement that the servers reside on the same host system.

While the above has been used an hypermedia banner as the vehicle for allowing the user to interactively request information, it is not intended that the present invention be limited to such banners. One skilled in the art, after have read the above will understand that the present invention is equally applicable to video, still pages or any other JAVA initiated applet.

Further modification of the Hardcopy server 53 includes using a real-time module which can dynamically create bar-codes as image files (e.g. GIF/JPEG) to be embedded into the HTML that is delivered for printing. This bar-code module could be used to support coupon and ticket printing banners until other technologies for securely/uniquely marking printed content are included with user-agents, printing devices and HTML.

Although the preferred embodiment of the invention has been illustrated, and that form described, it is readily apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

Claims

What is claimed is:

1. A method of providing a printable page (Fig. 3), the method comprising:

receiving a hardcopy request (501) for the printable page (Fig. 3) from a user agent (14);

retrieving (511) information to create the printable page (Fig. 3);

determining (513) a type of the user agent;

formatting (515) the printable page (Fig. 3) for the type of the user agent;

inserting print enabling code (515) into the printable page (Fig. 3); and

sending the printable page (Fig. 3) to the user agent.

2. The method as claimed in claim 1 wherein the step of inserting (515) further comprising the step of:

adding an automatic code in the user agent can automatically print the printable page.

3. The method as claimed in claim 2 further comprising the steps of:

the user agent (14) executing (523) the automatic code; and

the user agent (14) causing the printable page to print (527).

4. The method as claimed in claim 2 further comprising the step of:

in the absence of the automatic code the user agent (14) displaying instructions (533) for causing the printable page to print.

5. A method for delivering a dynamic printable page (Fig. 3) to a web browser (24), the method comprising the steps of:

requesting (509) the dynamic printable page (Fig. 3);

first retrieving template (511) used to create the dynamic printable page (Fig. 3);

second retrieving dynamic information used to create the dynamic printable page;

placing the dynamic information into the template to create the dynamic printable page (Fig. 3);

formatting the dynamic printable page (Fig. 3); and

delivering (517) the dynamic printable page to the web browser (24).

6. The method of claim 5 further comprising the steps of:

determining (513) a type of the user agent;

using the type to insert print enabling code (515) into the dynamic printable page (Fig. 3).

7. The method of claim 6 further comprising the step of:

maximizing print quality of the dynamic printable page (515) based on the type.

8. The method of claim 5 further comprising the steps of logging (605) each execution of the delivering step.

9. An apparatus (53) for delivering hardcopy (Fig. 3) from a hypermedia object, the apparatus comprising:

a request handler (601) for verifying and routing a proper request for the hardcopy (Fig. 3);

an HTML processor (602) for retrieving and formatting information to create the hardcopy (Fig. 3); and

a responder (604) to send the formatted hardcopy (Fig. 3).

10. The apparatus of claim 9 further comprising:

a request logger (605) for logging each request for the hardcopy.

The Patent Office

INVESTOR IN PEOPLE

Application No:	GB 9910093.5	**Examiner:**	Melanie Gee
Claims searched:	1-4	**Date of search:**	29 November 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): G4A (AFGDC, AUDB, AUXX)

Int Cl (Ed.6): G06F 3/12, 17/21, 17/30

Other: Online: WPI, EPODOC, INSPEC, COMPUTER

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A, E	GB 2331600 A	(INTERNATIONAL BUSINESS MACHINES), see whole document.	
A, P	EP 0851367 A1	(INTERNATIONAL BUSINESS MACHINES), see whole document.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.